

Claims

This listing of claims will replace all prior versions and listings of claims in the application:

1. (currently amended) A method of processing a flowable solid material that includes at least one low volatility, water-reactive metal chloride, the method comprising:

combining a flowable solid material that includes at least one low volatility, water-reactive metal chloride with a powdered hydrate, in the absence of liquid water, to provide a mixture of solids;

heating the mixture at a temperature greater than 80°C such that the hydrate thermally decomposes to release water vapor which then reacts with a low volatility, water-reactive metal chloride in the flowable solid material ~~reacts with the hydrate~~ without the formation of a liquid waste product; the amount of the hydrate and the water content thereof being sufficient to completely hydrate all the metal chloride; and

discharging the resulting mixture for disposal or metals recovery.

2. (previously presented) The method of claim 1 wherein the heating is carried out with the mixture further comprising milled sodium chloride.

3. (previously presented) The method of claim 1 wherein the flowable solid material contains at least one metal chloride selected from the group consisting of aluminum chloride, titanium chloride, vanadium chloride, chromium chloride, manganese chloride, iron chloride, cobalt chloride, nickel chloride, copper chloride, and zinc chloride.

4. (original) The method of claim 1 wherein the flowable solid material is from the production of chlorosilanes.

5. (original) The method of claim 1 wherein the flowable solid material is from the production of methylchlorosilanes.

6. (original) The method of claim 1 wherein the flowable solid material is from the production of titanium chloride.

7. (original) The method of claim 1 wherein the flowable solid material is from the production of hafnium and zirconium chloride.

8. (currently amended) A method of processing the residue from a chlorosilane manufacturing process, the method comprising:

concentrating a residue mixture containing volatile chlorosilanes and lower volatility components including at least one water-reactive metal chloride in a drier unit suitable for processing a solid fraction;

separating volatile chlorosilane vapors from the mixture to produce a substantially chlorosilane-free solid residue;

in the absence of liquid water, contacting the substantially chlorosilane-free solid residue with a hydrate at a temperature greater than 80°C such that the hydrate thermally decomposes to release water vapor which then reacts with the at least one water-reactive metal chloride ~~reacts with the hydrate~~ to produce a powder mixture without the formation of a liquid waste product; the amount of the hydrate and the water content thereof being sufficient to completely hydrate all the metal chloride; and

discharging the powder mixture.

9. (previously presented) The method of claim 8 further comprising contacting the substantially chlorosilane-free solid residue with an alkaline salt to increase the pH of the powder mixture.

10. (previously presented) The method of claim 8 further comprising, simultaneously: contacting the substantially chlorosilane-free solid residue with a hydrate; and contacting the substantially chlorosilane-free solid residue with the alkaline salt.

11. (original) The method of claim 10 wherein the contacting of the remaining substantially chlorosilane-free solid residue with a hydrate and the contacting of the remaining

substantially chlorosilane-free solid residue with the alkaline salt is accomplished by contacting of the remaining substantially chlorosilane-free solid residue with mechanically refined trona, which is a natural form of sodium sesquicarbonate, is a hydrated mineral, and provides an alkaline salt.

12. (previously presented) The method of claim 9 wherein:

the alkaline salt comprises calcium carbonate; and

the hydrate comprises damp natural soil.

13. (previously presented) The method of claim 9 wherein:

the alkaline salt comprises magnesium hydroxide; and

the hydrate comprises montmorillonite clay.

14. (original) The method of claim 8 wherein the residue mixture contains at least one metal chloride selected from the group consisting of aluminum chloride, titanium chloride, vanadium chloride, chromium chloride, manganese chloride, iron chloride, cobalt chloride, nickel chloride, copper chloride, and zinc chloride.

15. (currently amended) A method of processing the residue from a chlorosilane manufacturing process, the method comprising:

concentrating a residue mixture containing volatile chlorosilanes and lower volatility components including at least one water-reactive metal chloride in a drier unit that is suitable for processing a solid fraction in the presence of finely milled sodium chloride;

separating volatile chlorosilane vapors from the mixture in the drier unit to produce a substantially chlorosilane-free solid residue;

in the absence of liquid water, contacting the substantially chlorosilane-free solid residue with a hydrate in the drier unit at a temperature greater than 80°C such that the hydrate thermally decomposes to release water vapor which then reacts with the at least one water-reactive metal chloride ~~reacts with the hydrate~~ to produce a powder mixture ~~without the formation of a liquid waste product~~; the amount of the hydrate and the water content thereof being sufficient to completely hydrate all the metal chloride; and

discharging the powder mixture from the drier unit.

16. (previously presented) The method of claim 15 further comprising contacting the substantially chlorosilane-free solid residue with an alkaline salt to increase the pH of the powder mixture.

17. (original) The method of claim 16 further comprising simultaneously contacting the remaining substantially chlorosilane-free solid residue with a hydrate and contacting the remaining substantially chlorosilane-free solid residue with the alkaline salt.

18. (original) The method of claim 17 wherein the contacting of the remaining substantially chlorosilane-free solid residue with a hydrate and the contacting of the remaining substantially chlorosilane-free solid residue with the alkaline salt is accomplished by contacting of the remaining substantially chlorosilane-free solid residue with trona, which is a natural form of sodium sesquicarbonate, is a hydrated mineral, and provides an alkaline salt.

19. (previously presented) The method of claim 16 wherein:
the alkaline salt comprises calcium carbonate; and
the hydrate comprises damp natural soil.

20. (previously presented) The method of claim 16 wherein:
the alkaline salt comprises magnesium hydroxide; and
the hydrate comprises montmorillonite clay.

21. (original) The method of claim 15 wherein the at least one metal chloride is at least one metal chloride selected from the group consisting of aluminum chloride, titanium chloride, vanadium chloride, chromium chloride, manganese chloride, iron chloride, cobalt chloride, nickel chloride, copper chloride, and zinc chloride.